The Role of Web Broadcasts to Develop Online Learning Communities in STEM: a multiple case study

Conference or Workshop Item

The role of web broadcasts to develop online learning communities

Venetia Brown, Trevor Collins, Nicholas Braithwaite

Email: venetia.brown@open.ac.uk
Twitter: @venetiaW10

The Open University

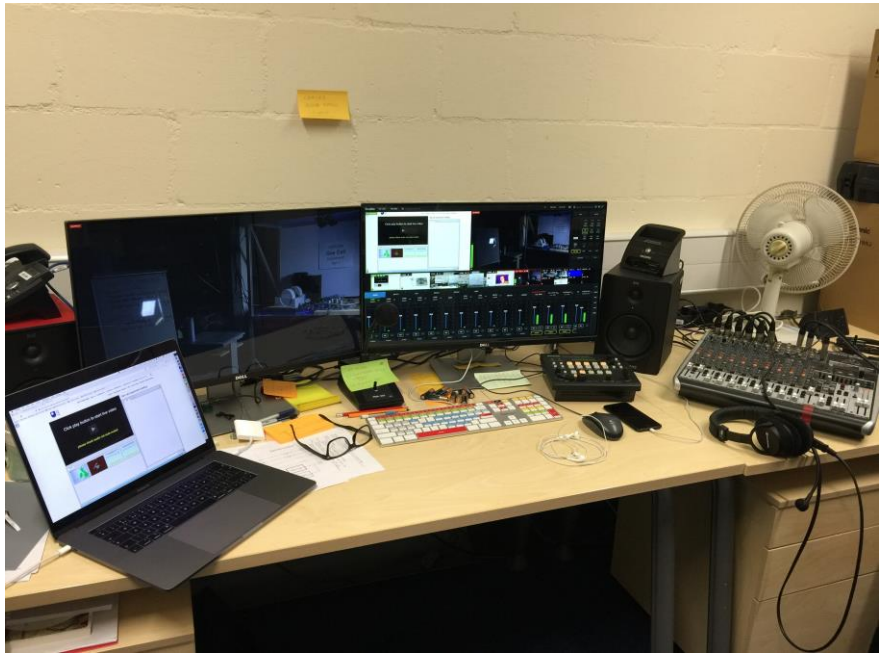
Knowledge Media Institute

Overview

- Introduction: Interactive web broadcasts
- Research focus: Sense of community and learning
- Methodology: Multiple case study (two of five modules)
- Preliminary findings: Analysis of interaction, survey and interview data
- Conclusion and next steps

Interactive web broadcasts

- Live web broadcasts known as (labcasts and fieldcasts).
- Integrate HD video streaming and audio,real-time chat messaging.
- Audience voting widgets allow interactive feedback.
- Production team, presenters and chat-room moderator.



Research focus

- How does web broadcasts influence students' sense of community and support their learning?
- The OU STEM Schools
  - Life, Health and Chemical Sciences
  - Computing and Communications
  - Physical Sciences
  - Environment, Earth and Ecosystem Sciences

Multiple case study

- Remote Experiments in Physics and Space
  - Observe interactivity to measure engagement
    - Interaction data (widgets, system data logs and chat transcripts)
  - Measure students' perceptions of their attitudes and sense of community
    - Online questionnaire
    - Classroom community scale (Rovai, 2002)
    - Feedback widgets
  - Explore students' opinions and perspectives
    - Semi-structured interviews

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Engagement during event

Title	Interactive Users	Chat users	Chat Posts
An interactive introduction to remote experiments in physics and space	59/59	45	92
The physics project	49/50	27	43
The planetary science project	34/37	20	125
Exploring Mars: interview with NASA expert	59/66	43	184

Title	Interactive Users	Chat users	Chat Posts
Fieldcast 1: Making Observations & Developing Hypotheses	120/130	79	246
Fieldcast 2: Developing Methods & Data Collection	110/113	69	199
Fieldcast 3: Analysing Data & Making Conclusions	99/111	69	230

Live feedback during a labcast

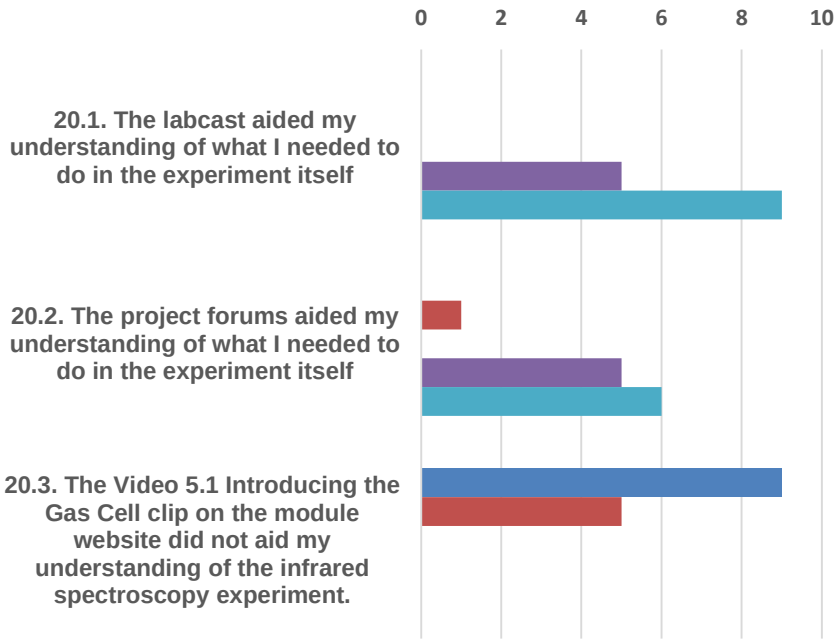
Word Cloud Wordle

- What 3 things would you take away from this astronomy labcast?

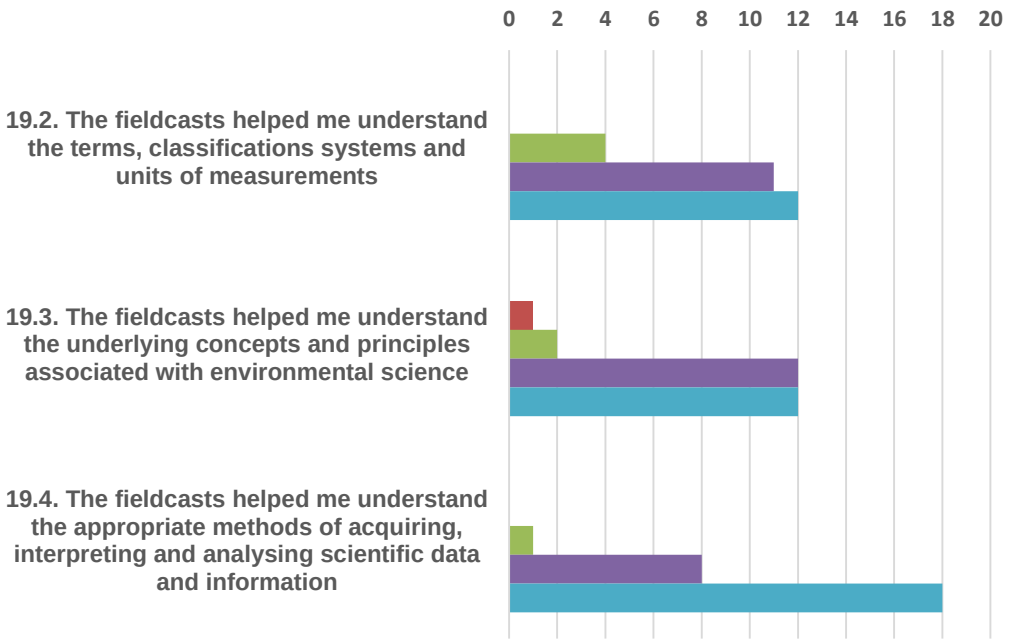
- Affective factors
  - confidence, clarity, kindred spirits
- Cognitive factors
  - experimental, planning, hypothesis testing

How did labcasts support your learning?

Physics and Space: 15/83 = 18%

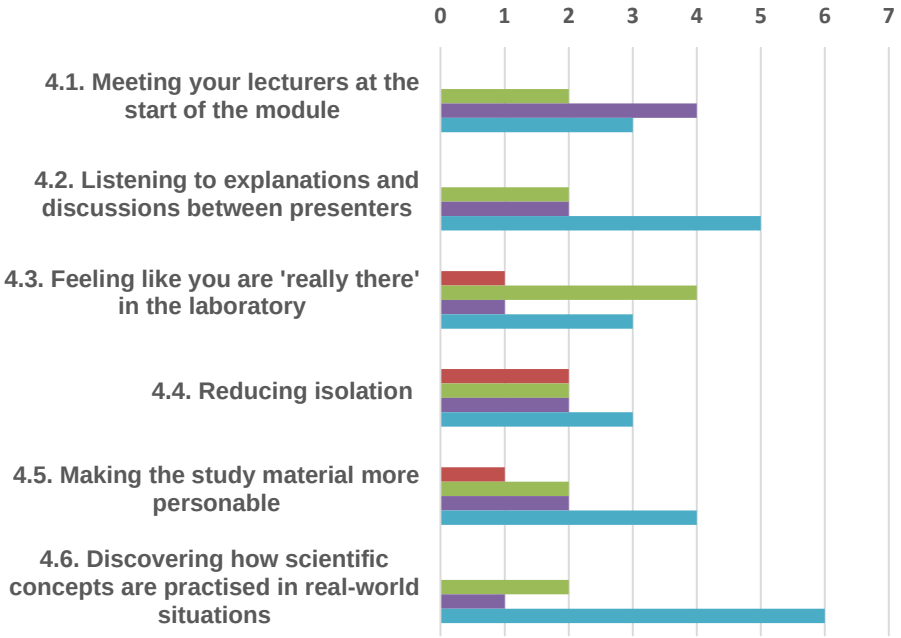


Environmental Science: 29/305 = 10%



How useful did you find the labcasts?

Physics and Space: 15/83 = 18%



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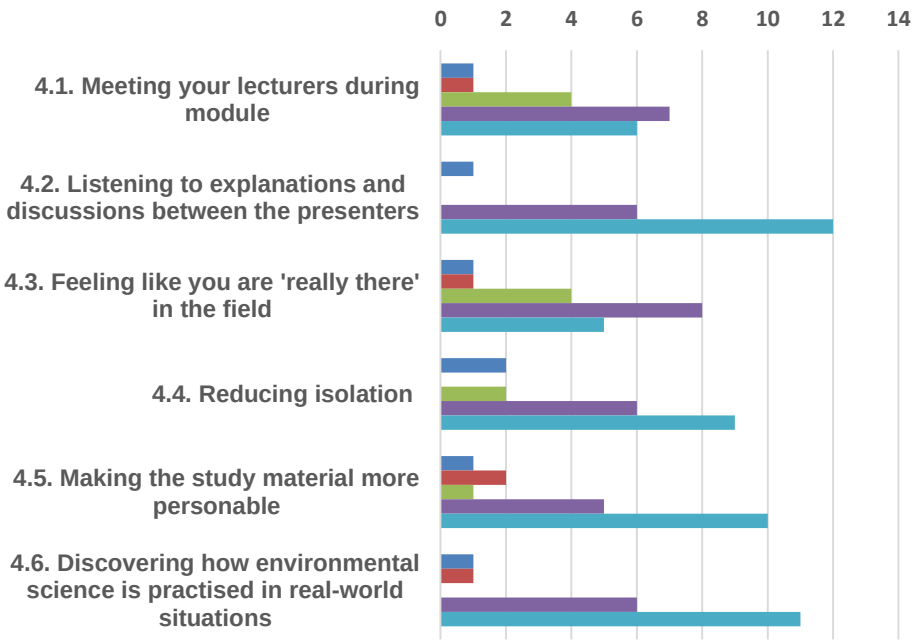

Not at all useful | Slightly useful | Moderately useful | Very useful | Extremely useful

Classroom community scale

20-item scale to measure perceived level of community within a course (Rovai, 2002)

Example of questions:

- I feel isolated in this module
- I do not feel a spirit of community

- I feel that I am encouraged to ask questions
- I feel uneasy exposing gaps in my understanding

Module	Connectedness /40	Learning community /40	Overall community /80
Remote experiments in physics and space	28.3 (S.D. = 6.0)	32.9 (S.D. =6.1)	61.2 (S.D. = 11.5)
Environmental sciences	22.9 (S.D. = 6.1)	29.8 (S.D. =5.5)	52.7 (S.D. =10.9)

Reference: Rovai, A.P. (2002). Development of an instrument to measure classroom community. The Internet and Higher Education, 5. 197–211.

Qualitative survey comments

Themes	Student data
Engagement	*"I liked that the students could vote and add to the fieldcast investigation". (RNL-E-S15)* *"I'm not convinced that audience participation is a good thing. Letting the scientists that you have choose a topic for investigation might be better". (RNL-E-S26)* *"I liked the scientists showing the experiments and explaining the features and how they operate. They made it interesting and engaging and seemed to work well together". (LAR-P-S06)*
Sense of Community	*"Made it seem like I was taking part". (LAR-E-S17)* *"I particularly liked the human angle in the interview for the Mars project labcast. Since being human is the only thing we all have in common for sure, I think it is important to see the human aspects of those that make science, not only the technical stuff". (RNL-P-S14)*
Learning	*"The recordings were a great help, enabling me to go back and look at the investigation again when writing my report". (RNL-E-S21)* *"I consider them extremely valuable at introducing the relevant project" (LNR-P-S07)*

Interview comments

What motivated you to attend the live event?

*we heard before that you get to **steer where it was going** so I really wanted to do that because like in the other assignments you're just given a scenario or whatever and you just have to work on it but with that you can be 'yeah I want that I think we should do this' and then we all vote (E-S03)*

*I think it was **the opportunity to listen to the practicing scientists**. It's good to listen to them and you get insights from hearing people speak and contributing in the chat and so on that you just don't get from reading a textbook (P-S01)*

*I think I could see from the module material that I have to **get my head around the theory** behind the design of a complex experiment and then do it and write it up. I thought labcasts would **introduce it in an easy to grasp way and would make that process easier**. (P-02)*

***I had the time**. It wouldn't be as good as being there… getting down and dirty in the mud. That would be better, **but this was the next best thing** and at least because it was February, we didn't get cold. (E-S02)*

Conclusions and future work

- Preliminary findings
  - Positive attitudes on sense of presence, engagement and learning
  - Study shows labcasts and fieldcasts can help foster a sense of community and perceived learning outcomes
  - Perceptions of community in labcasts may be influenced by sense of community in a module
  - Motivation to attend possibly indicates ownership of learning
- Next steps
  - Compare findings across five modules
  - Validate data with module teams
  - Feedback recommendations of good practice to staff
  - Develop a set of guidelines on the pedagogic and social features that support fieldcasts and labcasts